

Apoptosis as a mechanism of the cancer chemopreventive activity of glucosinolates: a review

ABSTRACT

Cruciferous vegetables are a rich source of glucosinolates that have established anti-carcinogenic activity. Naturally-occurring glucosinolates and their derivative isothiocyanates (ITCs), generated as a result of their enzymatic degradation catalysed by myrosinase, have been linked to low cancer incidence in epidemiological studies, and in animal models isothiocyanates suppressed chemically-induced tumorigenesis. The prospective effect of isothiocyanates as anti-carcinogenic agent has been much explored as cytotoxic against wide array of cancer cell lines and being explored for the development of new anticancer drugs. However, the mechanisms of isothiocyanates in inducing apoptosis against tumor cell lines are still largely disregarded. A number of mechanisms are believed to be involved in the glucosinolate-induced suppression of carcinogenesis, including the induction of apoptosis, biotransformation of xenobiotic metabolism, oxidative stress, alteration of caspase activity, angiogenesis, histone deacetylation and cell cycle arrest. The molecular mechanisms through which isothiocyanates stimulate apoptosis in cancer cell lines have not so far been clearly defined. This review summarizes the underlying mechanisms through which isothiocyanates modify the apoptotic pathway leading to cell death.

Keyword: Cruciferous vegetables; Glucosinolates; Isothiocyanates; Chemoprevention; Apoptosis